

CLAIMS

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1. A machine component coated with a thermal barrier coating, wherein the thermal barrier coating comprises a mixture of at least a refractory material and an indicator material having an optical emission spectrum which varies in response to the temperature of at least a region of the component.
2. A component according to claim 1, wherein the component is coated with one or more priming layers over which the thermal barrier coating is coated.
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3. A component according to claim 1 or 2, wherein the indicator material has an optical emission spectrum which varies in response to a physical parameter of the component.
4. A component according to claim 3, wherein the indicator material has an optical emission spectrum which varies in response to at least one physical parameter selected from the group consisting of a physical strain applied to at least a region of the component, erosion of at least a region of the component, and a physical stress of at least a region of the component.
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5. A component according to any of claims 1 to 4, wherein the refractory material is selected from the group consisting of yttria stabilised zirconia, yttria partially stabilised zirconia, and yttria aluminium garnet.
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6. A component according to any of claims 1 to 5, wherein the indicator material is a phosphor material.
7. A component according to any of claims 1 to 5, wherein the indicator material comprises a rare earth dopant.
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8. A component according to claim 7, wherein the indicator material comprises a dopant selected from the group consisting of terbium, europium, and dysprosium.
9. A component according to any of claims 1 to 8, wherein the indicator material comprises a compositionally-graded structure, a composite structure, or a multi-phase structure.
10. A component according to any of claims 1 to 9, wherein the thermal barrier coating comprises a layered structure of indicator materials having different respective emission spectra.
11. A component according to any of claims 1 to 10, wherein the thermal barrier coating comprises a layered structure of an outermost, substantially transparent region and a region including an indicator material optically interrogatable through the substantially transparent region.
12. A component according to any of claims 1 to 11, wherein the component is a component of a combustion engine.
13. A component according to claim 12, wherein the component is a component of a gas turbine engine.
14. A component according to claim 13, wherein the component is a turbine blade.
15. A component according to claim 13, wherein the component is a heat shield.
16. Use, as a thermal barrier coating for coating a machine component, of a mixture of at least a refractory material and an indicator material having an optical emission spectrum which varies in response to a physical parameter of the coated component.

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5 17. A machine having one or more internal components coated with a thermal barrier coating according to claim 16, the machine comprising:
a light source for directing an interrogating light beam onto the one or more components; and
a light collector for collecting light from the one or more components.

10 18. A machine according to claim 17, further comprising an analyser for detecting a physical property of the one or more components by analysis of light collected from the one or more components.

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19. A machine according to claim 17 or 18, wherein the machine is a combustion engine.